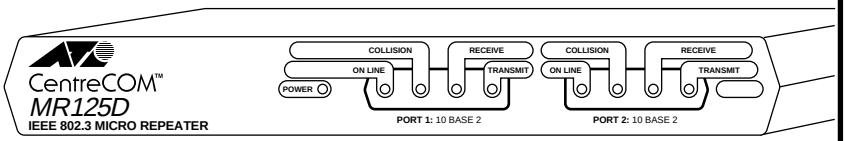
Allied Telesyn International

CentreCOM Two-Port Ethernet Micro Repeater Model AT-MR125D User Manual



PN 613-10368-00 Rev A

951026

Electrical Safety and Installation Requirements

RADIATED ENERGY

U.S. Federal Communications
Note: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and , if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Note: Modifications or changes not expressly approved of by the manufacturer or the FCC, can void your right to operate this equipment.

Canadian Department of Communications
This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

SAFETY

LIGHTNING DANGER
DANGER: DO NOT WORK on equipment or CABLES during periods of LIGHTNING ACTIVITY.

MOUNTING INSTRUCTIONS
CAUTION: These models are designed for operation in the HORIZONTAL position. VERTICAL MOUNTING must NOT BE DONE without the use of an Allied Telesyn vertical mount chassis designed for this purpose.

CAUTION: Air vents must not be blocked and must have free access to the room ambient air for cooling.

Operating Temperature
This product is designed for a maximum ambient temperature of 40 degrees C.

All Countries: Install product in accordance with local and National Electrical Codes.

SICHERHEIT

GEFAHR DURCH BLITZSCHLAG
GEFAHR: Keine Arbeiten am Gerät oder an den Kabeln während eines Gewitters ausführen

MONTAGEANWEISUNGEN
VORSICHT: Diese Modelle sind für Betrieb in horizontaler Position entworfen worden. Das Gerät darf NICHT OHNE Gebrauch eines dafür entworfenen Allied Telesyn-Vertikalmontagegestells in VERTIKALER POSITION montiert werden.

VORSICHT
De Entlüftungsöffnungen dürfen nicht versperrt sein und müssen zum Kühlen freien Zugang zur Raumluft haben.

Betriebstemperatur
Dieses Produkt wurde für den Betrieb in einer Umgebungstemperatur von nicht mehr als 40° C entworfen.

Alle Länder: Installation muß örtlichen und nationalen elektrischen Vorschriften entsprechen.

STRÅLINGSENERGI
Dette kommercielle produkt opfylder de krav, der i USA stilles til udstyr af Klasse A.

SIKKERHED

FARE UNDER UVEJR
FARE: UNDLAD at arbejde på udstyr eller KABLER i perioder med LYNAKTIVITET.

INSTRUKTIONER FOR OPSTILLING
ADVARSEL: Disse modeller er konstrueret til at betjenes i HORISONTAL position (vandret).VERTIKAL OPSTILLING (lodret) må IKKE FORETAGES uden brug af et Allied Telesyn vertikalt monteringsstel konstrueret til dette formål.

ADVARSEL: Ventilationsåbninger må ikke blokeres og skal have fri adgang til den omgivende luft i rummet for afkøling.

Betjeningstemperatur
Dette apparat er konstrueret til en omgivende temperatur på maksimum 40 grader C.

Alle Lande: Installation af produktet skal ske i overensstemmelse med lokal og national lovgivning for elektriske installationer.

STRALINGSENERGIE
Dit handelsprodukt werd getest en voldoet aan de Amerikaanse vereisten voor een klasse A toestel.

VEILIGHEID

GEVAAR VOOR BLIKSEMINSLAG
GEVAAR: NIET aan toestellen of KABELS WERKEN bij BLIKSEM.

MONTAGE-INSTRUCTIES
OPGELET: Deze modellen zijn ontworpen om te werken in HORIZONTALE stand. VERTICALE MONTAGE mag NIET UITGEVOERD WORDEN, tenzij een daartoe speciaal ontworpen Allied Telesyn chassis voor verticale montage wordt gebruikt.

OPGELET: De ventilatiegaten mogen niet worden gesperd en moeten de omgevingslucht ongehinderd toelaten voor afkoeling.

Bedrijfstemperatuur
De omgevingstemperatuur voor dit produkt mag niet meer bedragen dan 40 graden Celsius.

Alle Landen: het toestel installeren overeenkomstig de lokale en nationale elektrische voorschriften.

ÉNERGIE IRRADIÉE
Ce matériel a été testé et certifié conforme par la réglementation américaine aux normes définies pour les appareils de Classe A.

SÉCURITÉ

DANGER DE FOUDRE
DANGER: NE PAS MANIER le matériel ou les CÂBLES lors d'activité orageuse.

INSTRUCTIONS DE MONTAGE
ATTENTION: Ces modèles sont destinés à fonctionner en position HORIZONTALE. Le matériel NE DOIT PAS être utilisé en MONTAGE VERTICAL, à moins d'utiliser un châssis de montage vertical Allied Telesyn conçu à cet effet.

ATTENTION: Ne pas bloquer les fentes d'aération, ceci empêcherait l'air ambiant de circuler librement pour le refroidissement.

Température De Fonctionnement
Ce matériel est capable de tolérer une température ambiante maximum de 40 degrés Celsius.

Pour Tous Pays: Installer le matériel conformément aux normes électriques nationales et locales.

SÄTEILYENERGIA
Tämä kaupallinen tuote on testattu ja noudattaa Yhdysvaltojen vaatimuksia luokan A laitteelle.

TURVALLISUUS

SALAMANISKUVAARA
HENGENVAARA: ÄLÄ TYÖSKENTELE laitteiden tai KAAPELEIDEN KANSSA SALAMOINNIN AIKANA.

ASENNUSSOHJEET
HUOMAUTUS: Nämä mallit on suunniteltu käytettäviksi VAAKA-asennossa. PYSTYASENNUSTA EI SAA TEHDÄ ilman Allied Telesyn -pystykiinnitysalustaa, joka on suunniteltu tähän tarkoitukseen.

HUOMAUTUS: Ilmavaihtoreikiä ei pidä tukkia ja niillä täytyy olla vapaa yhteys ympäröivään huoneilmaan, jotta ilmanvaihto tapahtuisi.

Käyttölämpötila
Tämä tuote on suunniteltu ympäröivän ilman maksimilämpötilalle 40°C.

Kaikki Maat: Asenna tuote paikallisten ja kansallisten sähköturvallisuusmääräysten mukaisesti.

ENERGIA IRRADIATA
Questo prodotto commerciale è stato collaudato e risponde ai requisiti U.S.A. per i dispositivi di classe.

NORME DI SICUREZZA

PERICOLO DI FULMINI
PERICOLO: NON LAVORARE sul dispositivo o sui CAVI durante PRECIPITAZIONI TEMPORALESCHE.

ISTRUZIONI PER IL MONTAGGIO
ATTENZIONE: questi modelli sono concepiti per il funzionamento in posizione ORIZZONTALE. NON È POSSIBILE EFFETTUARE IL MONTAGGIO VERTICALE senza utilizzare l'apposito telaio per il montaggio verticale Allied Telesyn.

ATTENZIONE: le prese d'aria non vanno ostruite e devono consentire il libero ricircolo dell'aria ambiente per il raffreddamento.

Temperatura Di Funzionamento
Questo prodotto è concepito per una temperatura ambientale massima di 40 gradi centigradi.

Tutti I Paesi: installare il prodotto in conformità delle vigenti normative elettriche nazionali.

UTSTRÅLT ENERGI
Dette kommersielle produktet er blitt testet og funnet å være i samsvar med amerikanske krav for et klasse A-apparat.

SIKKERHET

FARE FOR LYNNEDSLAG
FARE: ARBEID IKKE på utstyr eller KABLER i TORDENVÆR.

BRUKSANVISNING FOR MONTERING
FORSIKTIG: Disse modellene er beregnet til bruk i HORISONTAL stilling. VERTIKAL MONTERING må IKKE UTFØRES uten bruk av et Allied Telesyn vertikal monteringschassis som er spesiallaget til dette formål.

FORSIKTIG: Lufteventilene må ikke blokkeres, og må ha fri tilgang til luft med romtemperatur for avkjøling.

Driftstemperatur
Dette produktet er konstruert for bruk i maksimum romtemperatur på 40 grader celsius.

Alle Land: Produktet må installeres i samsvar med de lokale og nasjonale elektriske koder.

ENERGIA IRRADIADA
Este produto foi testado e atende aos requisitos para dispositivos comerciais de Classe A dos E.U.A.

SEGURANÇA

PERIGO DE CHOQUE CAUSADO POR RAIO
PERIGO: NÃO TRABALHE no equipamento ou nos CABOS durante períodos suscetíveis a QUEDAS DE RAIO.

INSTRUÇÕES DE INSTALAÇÃO
CUIDADO: Estes modelos foram projetados para funcionar na posição HORIZONTAL. NÃO DEVE SER EFETUADA INSTALAÇÃO VERTICAL sem o uso de um chassis de montagem vertical Allied Telesyn projetado para este fim específico.

CUIDADO: As aberturas de ventilação não devem ser bloqueadas e devem ter acesso livre ao ar ambiente para arrefecimento adequado do aparelho.

Temperatura De Funcionamento
Este produto foi projetado para uma temperatura ambiente máxima de 40 graus centígrados.

Todos Os Países: Instale o produto de acordo com as normas nacionais e locais para instalações elétricas.

ENERGIA RADIADA
Este producto comercial ha sido probado y cumple con las normas requeridas en los EE. UU. para un dispositivo de Clase A.

SEGURIDAD

PELIGRO DE RAYOS
PELIGRO: NO REALICE NINGUN TIPO DE TRABAJO O CONEXION en los equipos o en LOS CABLES durante TORMENTAS ELECTRICAS.

INSTRUCCIONES DE MONTAJE
ATENCION: Estos modelos están diseñados para operar en posición HORIZONTAL. NO SE DEBEN MONTAR VERTICALMENTE sin el uso de un chasis de montaje vertical de Allied Telesyn que se ha diseñado para este fin.

ATENCION: Las aberturas para ventilación no deberán bloquearse y deberán tener acceso libre al aire ambiental de la sala para su enfriamiento.

Temperatura Requerida Para La Operación
Este producto está diseñado para una temperatura ambiental máxima de 40 grados C.

Para Todos Los Países: Monte el producto de acuerdo con los Códigos Eléctricos locales y nacionales.

ENERGIUTSTRÅLNING
Denna handelsprodukt har testats och befunnits vara i enlighet med USA:s krav för klass A utrustning.

SÄKERHET

FARA FÖR BLIXTNEDSLAG
FARA: ARBETA EJ på utrustningen eller kablarna vid ÅSKVÄDER.

MONTERINGSINSTRUKTIONER
VARNING: Dessa modeller är konstruerade för användning i HORISONTALLÄGE. VERTIKALMONTERING får EJ UTFÖRAS utan att ett Allied Telesyn specialkonstruerat vertikalt monteringschassi används.

VARNING: Luftventilerna får ej blockeras och måste ha fri tillgång till omgivande rumsluft för avsvalning.

Driftstemperatur
Denna produkt är konstruerad för rumstemperatur ej överstigande 40 grader Celsius.

Alla Länder: Installera produkten i enlighet med lokala och statliga bestämmelser för elektrisk utrustning.

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Overview

CentreCOM Micro Repeaters are two-port media converters designed for Ethernet coax network segments. CentreCOM Micro Repeaters support full length segments on either side, fully repeated transmission and the maximum number of nodes specified by the IEEE. Repeating packets results in a higher performance network by regenerating preamble, retiming the data packets and extending collision fragments to ensure collision enforcement by all nodes. The AT-MR125D is shown in Figure 1.

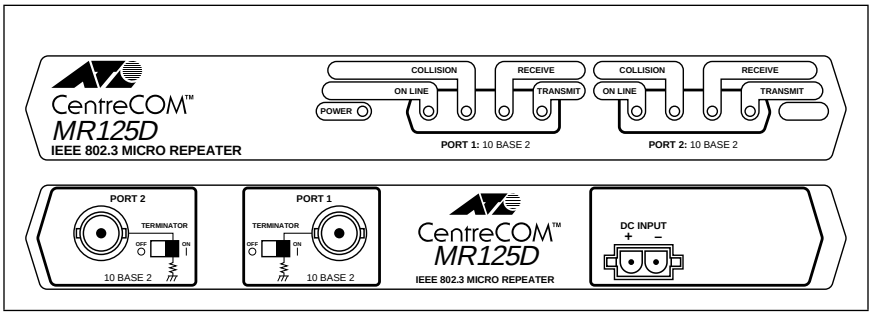

Figure 1: AT-MR125D Front and Back Panels

The AT-MR125D allows for connection of a thin (10BASE2) coaxial segment.

These media converters utilize state-of-the-art technologies, including a custom Application Specific Integrated Circuit (ASIC) and Surface Mount Technology (SMT), which provide enhanced functionality, increased reliability and improved performance. The use of a proprietary ASIC has permitted Allied Telesyn to make the CentreCOM Micro Repeaters exceptionally compact while providing the complete functionality of large repeaters. The small size of the units allows for the repeater function to be brought to the desktop or used in a wall mount installation.

Network diagnostic indicators are provided on the front of the micro repeaters to aid in troubleshooting and fault isolation. Each port has LEDs appropriate for the medium. For example, on the AT-MR125D, both ports have Transmit, Receive, On Line and Collision indicators.

Cabling

10BASE2 (Thin Coax) Connections

The micro repeater 10BASE2 thin Ethernet connections support a full 185 meters (606 ft.) of thin Ethernet coaxial cable. This coax segment will allow up to 30 Media Access Units (MAU) or transceiver connections including the connection to the CentreCOM Micro Repeater. The BNC coax connector may be plugged directly into the BNC connection without using a BNC-T connector and external 50Ω terminator. The termination is built in. If the micro repeater is not on either end of the segment, then the internal 50Ω termination must be disabled via the external switch located next to the BNC connector.

External Power Requirements

The AT-MR125D Micro Repeater is designed to accept a wide range of DC power input. The recommended voltage and power are as follows:

— +18V to +35 VDC operational voltage range
— +27 VDC preferred nominal voltage
— 500mA DC current requirement

Locate the +27V DC outlet at your site and plug the cable into the connector. The power indicator should illuminate. (See Figure 2.)

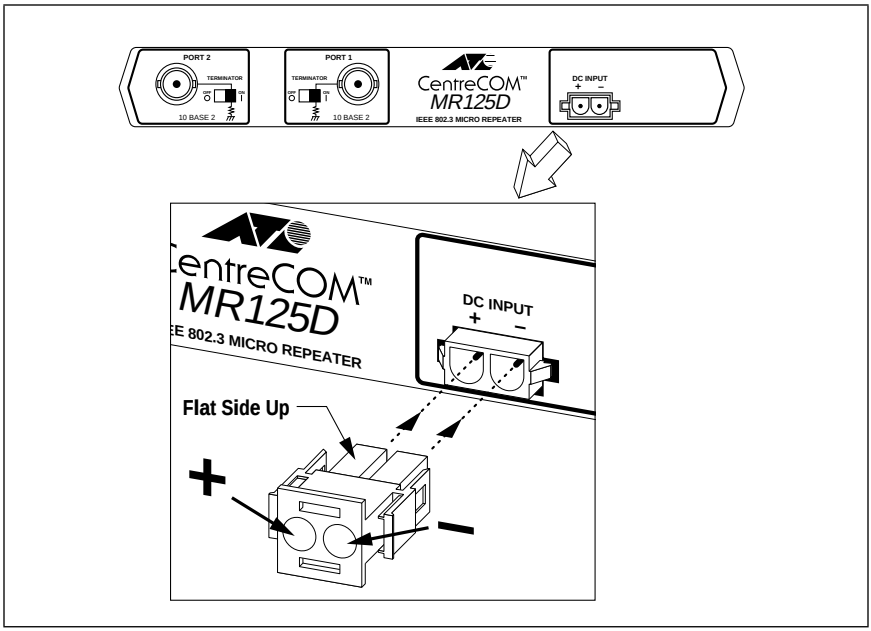

Figure 2: DC Input

Note If you use other than the voltage range specified in this manual you can permanently damage your micro repeater and void your warranty.

Operation

The CentreCOM Micro Repeaters re-time the Ethernet signal and regenerate the Ethernet packet and preamble. The micro repeaters also count the number of consecutive collisions. If this number reaches 32, then the repeater takes the segment Off Line (partition). If one valid Ethernet packet is received on that segment, the repeater places the segment On Line automatically, thus, disconnecting problem segments and reconnecting valid segments dynamically.

Switches

Two BNC ports on the AT-MR125D have two terminating switches for selecting or deselecting the internal 50 Ω termination function for the thinnet connection.

Note The factory default of the 50 Ω terminator switch is the ON setting. No external BNC-T and 50 Ω terminator are required when this switch is enabled.

Indicators

The following diagnostic indicators are common to the micro repeaters. These indicators are shown in Figure 3.

Power—Indicates the external source providing power to the micro repeater.

On Line—This indicator is lit when the port is ready for operation and is not partitioned.

Collision—Indicates a collision detected on that port.

Receive—This indicator will flash whenever a packet is received on that port. Brief flashes indicate low traffic levels.

Transmit—Indicates micro repeater transmitting a packet out of that port.

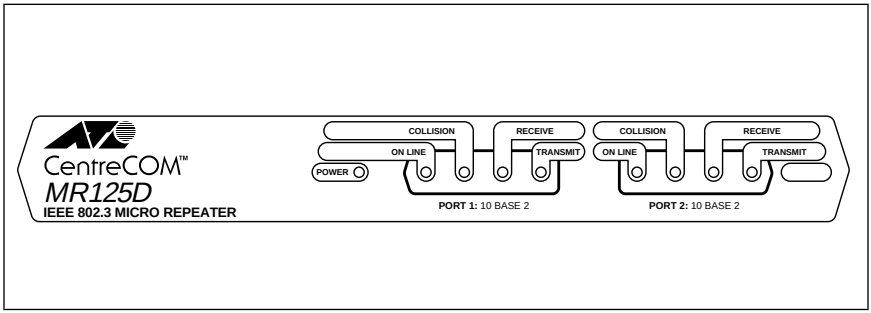

Figure 3: AT-MR125D Indicators

Troubleshooting

Power LED is lit but no packets are getting through (no network connections across the repeater)

1. Check to see if the port is receiving or transmitting packets by checking the Receive and Transmit indicators.
2. Check port connections and wiring. Check the termination switch on a 10BASE2 segment.

3. Check for excessive collisions.
4. Try another known good repeater to test and validate the segment.

On a 10BASE2 BNC port, there are too many collisions or packets are not getting through

1. Verify that the segment is properly terminated on both ends and that there is no other termination between these two points. You can plug the BNC connector directly into the micro repeater BNC connection if the internal 50 Ω termination function is enabled. If a BNC-T connector is to be used, the internal 50 Ω termination function should be disabled. Using an Ohm Meter (DMM or VOM), it is possible to statically test the coaxial segment. With terminators in place, measure the resistance of the cable from the male connector of a BNC-T. Touch one of the meter's probes to the inner pin and the other probe to the outside of the BNC-T. The resistance should be between 25 Ω and 30 Ω.
2. Check the media connections and cabling. Excessive collisions may be caused by network loading, a faulty cable or connection.

Configurations

The configuration in Figure 4 shows how an AT-MR125D is used to connect two 10BASE2 segments. The termination switch must be on.

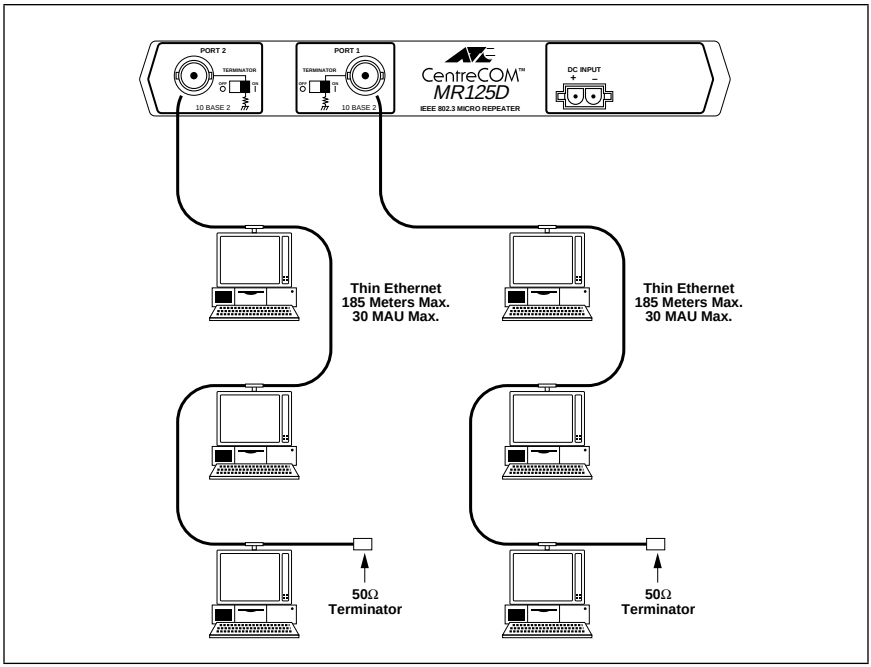

Figure 4: AT-MR125D BNC to BNC

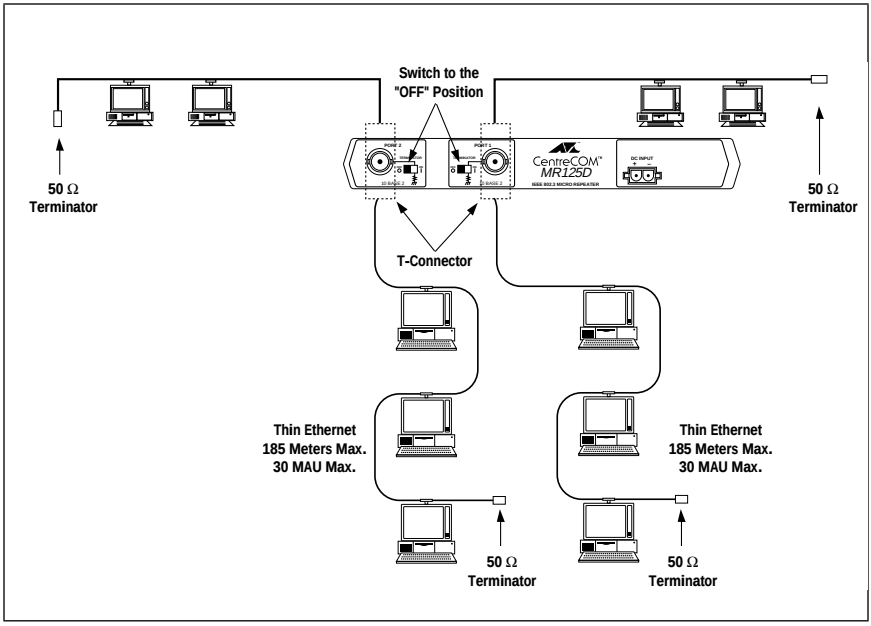

Figure 5: AT-MR125D BNC to BNC Using T-Connector

If the configuration in Figure 5 is used with BNC-T connectors in the center of a segment, the termination switch must be disabled (OFF) on the LAN repeater AT-MR125D.

IEEE 802.3 Quick Primer

AUI "Drop" Cables

AUI or "Drop" cables can be no longer than 50 meters (164 ft.) each. Attachments may be made only to the cable ends at the 15 pin D-sub connector. AUI "Drop" cables may have a maximum 257ns propagation delay for computing the worst case propagation delay of a cable system. AUI cable propagation delay is about 5.13 ns/meter. This cable internally consists of four shielded twisted pair wires with an overall shield and drain wire; a 15 pin D-sub male connector at one end and a 15 pin D-sub female connector at the other end. Cable impedance is typically 78Ω. The AUI cable typically connects a transceiver attached to a coaxial segment to a Data Terminal Equipment (DTE) workstation.

10BASE-T

10BASE-T UTP media was implemented to reduce Ethernet wiring costs. UTP wiring is installed in most buildings for telephone systems. Much of this existing cabling is suitable for Ethernet 10 Mb data rates. Care must be taken to ensure the buildings UTP wiring is able to carry these Ethernet data rates before a 10BASE-T network solution is implemented. Unlike coaxial Ethernet, 10BASE2 and 10BASE5, 10BASE-T UTP is point-to-point wiring. Typically, an Ethernet 10BASE-T transceiver (MAU) is connected to one end and a 10BASE-T Hub (Repeater) is connected to the other. Straight-through cabling pinout is used for Hub to MAU connections. Hub to Hub and MAU to MAU connections are allowed using a UTP cable with a cross-over function crossing TD+ and TD- with RD+ and RD- signals. No other attachments are allowed along the length of UTP wire, however, wiring patch panels and punch-down blocks are allowed for interconnecting segments. The cable should be Type 3 UTP, 100Ω impedance, 22 to 24 AWG and should not exceed 100 meters (328 ft.) in length from one end to the other.

Thin (10BASE2) Ethernet

When configuring thin coax segments, IEEE 802.3 specifications allow 29 or fewer MAUs per cable segment spaced at no less than 0.5 meter (1.6 ft.). The 10BASE2 (thin) cable length can not exceed 185 meters (606 ft.) per 10BASE2 (thin) cable segment. The worst case propagation delay for a 185 meters (606 ft.) thin Ethernet segment is 950.9 ns. The propagation delay for 10BASE2 (thin) Ethernet cable is 5.14 ns/meter. Both ends of the segment must be terminated with a 50Ω termination with a power rating of 0.5 watts or greater. Earth grounding of the segment shield must take place at only one point on the cable.

Thick (10BASE5) Ethernet

When configuring thick coax segments, IEEE 802.3 specifications allow 100 MAU attachments or less, spaced at multiples of 2.5 meters (8.2 ft.) measured accurately from the cable end (50 Ω terminator included). The thick cable segment cannot exceed 500 meters (1640 ft.) in length. Worst case "end-to-end" propagation delay of a thick coax segment is 2165 ns. Propagation delay of thick Ethernet coax is calculated at 4.33 ns/meter. Both ends of the segment must be terminated with a 50 Ω termination with a power rating of 0.5 watts or greater. Earth grounding of the segment shield must take place at only one point on the cable.

Propagation

Round-trip propagation delay throughout the entire cable system, from farthest ends, may not exceed 51.7 μs.

Propagation delay is the time it takes a signal to travel from the input of a system component to the output. Propagation delay is usually measured in nanoseconds. IEEE 802.3 has specific propagation delay maximums for the Ethernet components. Cable length plays a major role in propagation delay. (That is, a 50 meter [164 ft.] AUI cable has a maximum propagation delay of 257 ns.) The propagation delay of a cable is dependent on the length and velocity factor of the cable type.

Four Repeater Rule

No more than four repeaters can be linked to connect five segments and no other attachments may be on the linking segments. If attachments are present on the repeater coax link segments, then no more than two repeaters linking three segments may be configured. These limitations are set to keep propagation delay, packet jitter and signal attenuation to within acceptable standards.

Glossary

10BASE2— Also called thinnet or CheaperNet, 10BASE2 is a 10 MHz, Baseband, 185 meter (606 ft.) coaxial segment. Cable impedance is 50Ω.

10BASE5— Also called thick Ethernet, 10BASE5 is a 10 MHz, Baseband, 500 meter (1639 ft.) coaxial segment. The cable is also referred to as "yellow" cable. Cable impedance is 50 Ω. Thick Ethernet cable is typically used as a trunk or backbone path of the network.

10BASE-T— IEEE 802.3 UTP Ethernet. Using low cost UTP wiring, 100 meters (328 ft.) of point to point link segments are possible. Uses RJ45 connectors and sometimes 50-pin AMP connectors to a patch panel.

15 PIN D-SUB CONNECTOR— The AUI cable uses 15-pin D-connectors. D refers to the shape of the connector shell and sub refers to the size. Also called D-sub miniature, miniature D, DB-15, or DIX connectors. In Ethernet, a female 15-pin connector is a DTE connection and a male 15-pin connector is a transceiver connection. Male always attaches to female; gender changing is not allowed.

ATTACHMENT UNIT INTERFACE (AUI)— The cable connection from an MAU (transceiver) to a DTE (typically a workstation) consisting of a 15-conductor twisted pair cable of 50 meters (164 ft.) maximum length.

BNC SERIES — A 10BASE2 thin coax connector with push-on bayonet locking lug that quickly locks into place with a half twist.

COAX SEGMENT — A segment of Ethernet cable that contains MAU. See also Link Segment.

DATA TERMINAL EQUIPMENT (DTE)— The MAU with an AUI cable. The DTE could be a Ethernet workstation, host (server), repeater, bridge, router, or gateway. DTE connections are female 15-pin connectors.

DIX CONNECTOR — see also D-Sub Connectors

HEARTBEAT — see also SQE Test

IMPEDANCE — An electrical characteristic of a circuit dealing with the combination of the AC and DC resistance and the appearance of that resistance to attached circuits.

JABBER — This function is the MAU's ability to automatically inhibit the transmit data from reaching the medium if the transmit data time length exceeds 150 ms duration. This protects the medium from being overrun with data packets from a possibly defective device.

JITTER — The fluctuation of the data packet in respect to a standard clock cycle. Jitter is undesirable and must be minimized.

LINK SEGMENT — The link segment of coaxial cable is a segment which has no MAU devices but links two LAN devices such as repeaters together in a point-to-point configuration. By the inherent nature of 10BASE-T and fiber optic media, these media are point-to-point link segments.

MEDIA ATTACHMENT UNIT (MAU) — Provides an electrical attachment to a 10BASE2 or 10BASE5 coaxial cable segment. The MAU will convert the IEEE 802.3 composite signal into separate signals for Data In (circuit A and B), Data Out (circuit A and B), Control In (circuit A and B). Control Out (circuit A and B), Voltage Plus and Voltage Common.

N SERIES — A barrel shaped, threaded connector used on 10BASE5 (thick Ethernet) coaxial cable.

PROPAGATION DELAY — The time it takes a signal to travel from the input of a system component to the output. Usually measured in nanoseconds. IEEE 802.3 has specific propagation delay maximums for computing propagation budgets when designing a LAN. Cable length plays a major role in propagation delay. (i.e., a 50 meter [164 ft.] AUI cable has a maximum allowable propagation delay of 257 ns.) The propagation delay of cable is dependent on length and velocity factor of the cable type. There are also propagation delays associated with electronics attached to the system.

SIGNAL QUALITY ERROR (SQE) — Also referred to as Collision or Collision Presence. This occurs when two devices attempt to transmit at the same time which is an illegal condition.

SQE TEST — Commonly referred to as heartbeat, is a special 802.3 signal sent by the MAU to the DTE to test the collision reporting mechanism. Some DTE want SQE Test and others do not. Repeaters do not want SQE Test.

THICK ETHERNET — see also 10BASE5

THIN ETHERNET — see also 10BASE2

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Technical Support Fax Order Form

Name_____

Company_____

Address _____

City _____ **State/Province**_____

Zip/Postal Code _____ **Country**_____

Phone_____ **Fax**_____

Incident Summary

Model number of Allied Telesyn product I am using_____

Network software products I am using (e.g., network managers)_____

Brief summary of problem _____

Conditions (List the steps that led up to the problem)_____

Detailed description (Use separate sheet, if necessary.)

When completed, fax this sheet to the appropriate ATI office. Fax numbers can be found on page 17.

CentreCOM AT-MR125D Manual Feedback Form

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